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Urban Open Spaces

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Considerable advances in urban open-space research and design practice have occurred in the past decade. Influenced by a growing concern for the quality of the public environment of cities, substantial public and private resources have been devoted to improving urban open spaces.

Environmental design research has been increasingly called upon by designers and public officials to provide information useful for creating more successful urban places. Open space researchers have taken an active role in urban environmental improvement by producing conceptual, theoretical, and practical information on the use and meaning of open spaces such as parks, playgrounds, streets, and plazas. Significant advances in research and application have been made since the appearance of earlier reviews of urban open space.¹ This progress affords a timely opportunity for critical review.

Material for this chapter was drawn, in part, from a review of research advances published during 1978–1985 in *Children's Environments Quarterly*, *Environment & Behavior*, *Garten + Landschaft*, *Journal of the American Planning Association*, *Journal of Leisure Research*, *Landscape*, *Landscape Architecture*, *Landscape Planning*, *Landscape Journal*, *Landscape Research*, and *Places*. Material was also drawn from a review of proceedings of the annual meetings of the Environmental Design Research Association (EDRA), Council of Educators in Landscape Architecture (CELA), and International Association for the Study of People and their Physical Surroundings (IAPS).

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¹Most recent reviews of open-space research and design include Heckscher and Robinson (1977) on urban parks and Marcus and Moore (1975) on children in open space. See also Taylor (1981) for many useful review articles on the role of open space in urban life.

This review explores advances in that part of urban open-space research which has contributed theory or empirical findings useful for the improvement of the public landscape of cities. The chapter is divided into six parts. The first briefly examines common approaches to open space research including case study, applied, and action research approaches. In the second part, advances in setting-focused research, based on a typology of traditional and innovative open-space types, are discussed. The third section reviews some critical issues which have emerged from past research, involving behavioral, perceptual, participatory, and economic dimensions of urban open space. Next, methodological advances contributed from past work are briefly discussed, followed by a review of design and management application of research results. Specific dimensions essential for creating successful open space are presented, and an evaluation and redesign process is outlined for integrating open-space qualities more fully into design and planning. The chapter concludes with a review of important frontiers for future open-space research.

RESEARCH APPROACHES TO URBAN OPEN SPACES

Open spaces such as parks, playgrounds, and plazas have been criticized in the past as largely failing to serve their intended uses and users (Hester, 1984; Jackson, 1981). Nonuse of parks, vandalism, and outdated facilities are examples of problems commonly identified with urban open spaces. Indeed, urban open-space research originated from public awareness of the social failure of many urban open spaces.²

Research over the past decade focusing on previously neglected aspects of open space quality has provided recognition of the social, psychological, and economic benefits of urban open space. Research has been carried out on open spaces such as play streets, community gardens, and town trails. Traditional research approaches have been modified to more effectively formulate open-space policy or recommendations for redesign, such as those which take account of the importance of providing solar access to downtown and neighborhood open spaces (Bosselmann, 1983a).

Most of the work on urban open spaces can be classified as case studies of real places such as parks, malls, and playgrounds. Case-study researchers have used outdoor settings as laboratories for testing basic questions of use, perception, and environmental meaning of urban space. Whyte's (1980) widely recognized work on urban plazas grew out of a number of case studies using time lapse film to document the use of plazas in midtown Manhattan in the

²See Cranz (1981) for a useful historical review of the rise of public awareness of and research on urban parks.

1970s. Whyte's work has contributed many useful design principles such as the importance of providing comfortable "sittable" space in open spaces. Conceptual findings on the relationship of traffic reduction to environmental quality of neighborhood streets resulted from empirical studies by Appleyard (1981) of San Francisco and Berkeley neighborhoods with long-standing traffic problems. Findings on the increased use by children of neighborhood street improvements were based on studies made both before and after construction of new play streets in Holland and West Germany (Eubank-Ahrens, 1985; van Andel, 1985). Brower's work on the relationship of neighborhood control to perceived safety grew out of empirical observations of street use in several Baltimore neighborhoods (Brower, Dockett, & Taylor, 1983; see Figure 1).

The case study approach has some limits which have hampered application of research findings. For example, the fact that case studies have not always used comparable methods often makes it difficult to compare results: the findings of an interview study of a neighborhood park are difficult to compare to a behavior-mapping study of a plaza. There have been a few comparative studies of playgrounds (Hayward, Rothenberg, & Beasley, 1974), plazas (Whyte, 1980), and community open spaces (Francis, Cashdan, & Pahson, 1984), but these are still limited in numbers. Problems with comparable methods and studies have contributed to the reluctance on the part of planners and designers to apply case study findings.

A growing body of research has directly improved open spaces through evaluation and redesign. Utilizing a "postoccupancy evaluation" approach (Cooper, 1975; Zeisel, 1981), applied studies have attempted to directly influence the redesign and management of open spaces.

Similar in methodological approach to case study research, applied work frequently responds to an observed problem in an existing open space, such as lack of use. Frequently the study is commissioned by an open-space manager such as a city parks department. Applied design and management studies have been so successful that in some cases consulting groups have been established which specialize in evaluating, programming, and redesigning existing open spaces. Project for Public Spaces Inc., a nonprofit environmental consulting group in New York City, maintains a large staff involved in applied design studies of malls, plazas, and parks in various parts of the United States (Project for Public Spaces Inc., 1978, 1981, 1984).

Examples of applied design studies include the consulting work of Whyte, where he has been asked to apply his research findings to the reprogramming of Boston's Copley Square Plaza (Chabier, 1985) and the development of open-space guidelines for San Francisco's acclaimed downtown plan (San Francisco Department of City Planning, 1985). A further example is the work of Cohen, McGinty, and Moore (1979) commissioned by the U.S. Army Corps of Engineers to develop guidelines for design of playgrounds on Army bases.



FIGURE 1. Use is widely regarded as one of the prerequisites for a successful open space, as with these people viewing performer in Beaubourg Plaza, Paris.

Applied design research has suffered from some of the same methodological problems as case study research. Further limitations on this approach stem from the often crashing speed at which the research is done as well as the tendency of clients to want to influence research findings. Applied open-space research can be expected to expand with continuing public and private concern for open space quality.

Another approach, now emerging, is action research. Borrowing methods and concepts from traditional research approaches, action research involves the direct and continuous feedback of research findings into policy, design, and future research (Sommer, 1983; Weisman, 1983). Examples of advances in action research include the work of Robin Moore (1980) who involves children as active researchers and designers of outdoor environments. This approach has also been applied to the programming and design of neighborhood playgrounds (Francis, 1983b) where the research process helps children and adults directly negotiate differences in environmental values. An action research approach is currently being used by a research team headed by Roger Hart to evaluate the "Playground for All Children" in Flushing Meadows Park, Queens, New York. Employing case study methods such as post-occupancy evaluation, and exploring basic research questions regarding children's play, the New York City researchers are continually modifying the environment as they study it. Research findings are also used to train playground managers and play leaders to more effectively utilize the playground (see Figure 2).

A comparative study of community open spaces, including user-built gardens and parks, (Francis *et al.*, 1984) also utilized an action research approach. The researchers proposed design and management recommendations, based on research findings, for each project studied. The action research approach included holding a conference to discuss research findings, as well as the development of city-wide and national policy recommendations. This conference resulted in

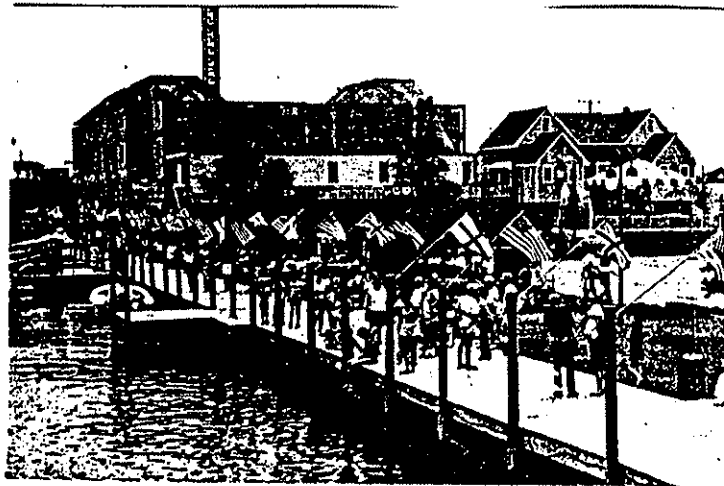


FIGURE 2. Waterfront boardwalk in Manteo, North Carolina designed and built with action research approach developed by landscape architect Randy Hester (photo by Randy Hester).

the establishment of a citywide Neighborhood Open Space Coalition involved in implementing the study's recommendations.

SETTING-FOCUSED RESEARCH: A DEFINITION AND REVIEW

Most research advances have resulted from studies of specific open-space settings. These include studies of traditional types such as neighborhood parks, playgrounds, and urban plazas as well as innovative open spaces such as waterfront parks and redesigned neighborhood streets.

One reason for the growth of urban open-space types is the expanding definition of what urban open space is. For this review, urban open spaces are defined as publicly accessible open places designed and built for human activity and enjoyment. These may include parks, neighborhood playgrounds, community gardens, downtown plazas, streets, and malls. This definition is drawn from the work of Lynch (1981) who argues that open space is open when it is accessible. A fenced waterfront area or a mall locked at night is not urban open space. A more useful way of defining and categorizing urban open space than simply "open" and "closed" may be to distinguish between "accessible" and "unaccessible" open space.

An example of the importance of basing the definition of urban open spaces on public access is seen in the indoor atrium spaces being included in newer downtown developments such as the CitiCorp and IBM Centers in New York City, Crocker Plaza in San Francisco, or the interior spaces of the Hyatt Regency Hotels. Approved in lieu of outdoor open spaces that the developers were required



FIGURE 3. The problem of downtown parks and plazas being privatized is seen in this sign stating restrictions on public use of Levi Strauss Plaza in San Francisco.

to provide, such as parks or plazas, atrium spaces are often private open spaces where public access is controlled or restricted. In an observational study of CitiCorp's atrium Marketplace, researchers found that space managers utilized "social filters" such as guards to allow some users in while excluding undesirable ones (Rivlin & Francis 1979). Whyte (1980) argues that indoor atrium spaces also may dilute adjacent street life by pulling in activity that is normally part of outdoor space. Criticism such as these are forcing some cities to develop regulations to ensure public access to enclosed spaces. For example, New York City has required owners of buildings with interior atrium spaces to alter their restrictive management practices and to post large signs stating that the space is "open to the public" (cf. Figure 3).

The awareness of open spaces as the larger public landscape of cities is providing increased public support for design innovation and research activity. Table 1 presents a typology of open spaces that illustrates some of the expanding boundaries of urban open-space design and research. A brief review of studies conducted on both traditional and newer forms of open spaces follows.

STUDIES OF TRADITIONAL URBAN OPEN SPACES

Open spaces such as public and neighborhood parks, playgrounds, malls, and plazas have attracted considerable research attention over the past decade. Public parks have been among the most frequently studied open spaces. Some basic work on urban parks has been completed which points to the psychological benefits of open space use (Ulrich & Addoms, 1981). An applied design research example can be seen in the work done over the past decade to study and renovate Central Park in New York City. Park planners are systematically renovating Central Park utilizing a variety of data including historical research on Olmsted's original design intentions, studies of the use of areas such as the Rambles and Bethesda Fountain, and inventories of wildlife and vegetation.

Some studies have identified crime and drug use problems in downtown parks. These include studies on the relationship between physical layout of urban parks and safety. Stoks (1983) inventoried sites of 65 rape cases in Seattle and evaluated the physical characteristics of each site. He found barriers such as dense vegetation, building walls, and fences along with proximity to pedestrian routes and bus stops to be common features of rape sites. Nager and Wentworth (1976) evaluated use in Bryant Park, located behind the New York City Public Library in midtown Manhattan. They found that fence and hedge enclosures supported drug dealing and served as barriers preventing users from feeling secure while in the park. Their findings provided empirical support for a multimillion dollar renovation of the park. Some park managers are recognizing that park

TABLE 1. A Typology of Traditional and Innovative Urban Open Spaces

Type	Characteristics
Traditional	
Public parks	A public open space; developed and managed by Parks Department as part of zoned open-space system of city; often located near center of city; often larger than neighborhood parks
Neighborhood parks	Open space developed in residential areas; managed by Parks Department as part of zoned open space of cities; may include playgrounds, sports facilities, and so forth
Playgrounds	Play area located in neighborhood; frequently includes traditional play equipment such as slides and swings; sometimes include amenities for adults, such as benches, and so forth
Pedestrian malls	Street closed to auto traffic; pedestrian amenities provided such as benches, planting; often located on the main street in downtown area
Plazas	Open space developed as part of new building in downtown area; built and managed by building owners; typically privately developed and managed
Innovative	
Community open spaces	Neighborhood spaces designed, developed, owned, and/or managed by local residents on vacant land; may include viewing gardens, play areas, and community gardens; often developed on private land; not officially viewed as part of open-space system of cities; highly vulnerable to displacement by other uses such as housing
Neighborhood open spaces	Space located in neighborhood often near private open space; often heavily used by children and teenagers; important setting for environmental learning and socializing
Schoolyards	Not normally considered part of open-space system of cities; increased awareness as place for environmental learning; some schoolyards redeveloped as environmental centers
Streets	Much of the publicly accessible open space of cities; increased awareness of importance of street use and traffic impacts on children; changes to streets include pedestrian improvements and sidewalk widening, street tree planting, and so forth
Transit malls	Development of improved transit access to downtown areas; may replace a traditional pedestrian mall with a bus and "light rail" mall

(Continued)

TABLE 1. (Continued)

Type	Characteristics
<i>Innovative (continued)</i>	
Farmers' markets	Open space used for farmers' markets or fleamarkets; often temporary or held only during certain times in existing space such as parks, downtown streets, or parking lots
Town trails	Connects parts of cities through integrated urban trails; use of streets and open spaces as settings for environmental learning
Vacant/Undeveloped open spaces	Still much of the open space in cities; found in redevelopment areas, where abandonment has occurred, or in undeveloped areas; increased awareness as potential open space; interest in vacant land being used to develop urban forests or natural areas in cities
Waterfronts	Increased awareness of waterfronts as urban open space; many cities working to increase public access to waterfront areas by developing waterfront parks
Found spaces	Informal open spaces of cities where social life takes place; include street corners, sidewalks, paths connecting buildings, bus stops, steps to public buildings, and so forth

users change over time and that city parks may need to be continually reprogrammed and redesigned.

Another common type of traditional open space is represented by neighborhood parks, which comprise much of the official open-space system of cities. The use and management of neighborhood parks has been of concern to urban recreation officials and researchers. Higher maintenance costs, vandalism, and decreasing park budgets have encouraged development of new approaches for designing and managing neighborhood parks.

Children's play activity is also an expanding area of environmental design research. Much of this work has been on playgrounds with documentation of the lack of use of traditional playgrounds as well as a search for alternatives. A 1978 study of playgrounds in Philadelphia (reported in Wuellner, 1979), found that play equipment was vacant at least 88% of peak use periods. Studies of traditional playgrounds support the need for nontraditional forms of physical design which provide for a wider range of developmental and motor activities. There is also evidence of the value of other play settings such as adventure playgrounds, natural areas, and neighborhood space in child development (Moore, 1985).

Some research (Callecod, 1974) supports important theoretical findings by Nicholson (1971) that playgrounds offering loose parts, challenge, and complexity

are most preferred by children. Brown and Burger (1984), in an observational study of children's free play in six outdoor environments, found provision of movable materials an important prerequisite to outdoor play. In a comparative study of several playground types, Hayward *et al.* (1974) observed that an adventure playground in New York City offering movable parts was more preferred and used for longer periods by children than a nearby traditional city playground. Research findings such as these are leading some playground designers toward creating more naturalistic and diverse playgrounds (Eriksen, 1986).

Another type of open space is the pedestrian mall. The proliferation of malls in the 1960s and 1970s has led some critics to label this phenomenon the "mall of America" and spurred researchers to examine their use and impact (Knack, 1982). One problem identified with many malls is that they have attracted the very types of users merchants were hoping to discourage. Fear of undesirables congregating in downtown malls has prompted efforts to displace certain groups from downtown spaces through increased police patrols, redesign such as the



FIGURE 4. Some landscaped pedestrian malls such as the Sacramento Mall have been replaced by transit malls to improve public transit access to downtowns.

removal of benches, and eventually the demolition of malls in some cities such as Sacramento, California (see Figure 4).

The redevelopment of city centers in the 1960s and 1970s included construction of new downtown plazas as part of new corporate or commercial buildings. Building with private funds, plaza developers were granted zoning bonuses for providing open spaces. Yet observational research on some of the early plazas in New York by Whyte (1980) and in Chicago by Rutledge (1976) identified the problem of limited use. In a more recent study, Grace Plaza in New York City was found to have been purposely designed to discourage use and to serve primarily as a visual entrance for the Grace Corporation (Carr, Francis, Rivlin, & Stone, in preparation). Problems with plazas encouraged some cities to develop more rigorous zoning requirements to foster better use of downtown open spaces. Cities such as New York, Cleveland, Chicago, and Los Angeles, before approval of design plans, now require developers to show how plazas will contribute to overall downtown vitality.

Research on plazas has contributed to a better understanding of the effect of physical design on plaza use. For example, Joardar and Neill (1978) found in an empirical study of use at 10 outdoor plazas in downtown Vancouver that subtle differences in configuration effected users' enjoyment of plazas. They found that edges provided better viewing areas and sitting options than interior parts of the plaza.

STUDIES OF INNOVATIVE OPEN SPACES

Several new forms of open spaces have been developed during the past decade. With awareness that traditional types of spaces do not satisfy all recreational needs, community open spaces, neighborhood play streets, and transit malls are increasingly becoming part of the urban landscape.

The failure of traditional neighborhood parks and playgrounds has encouraged residents to develop their own parks and gardens (Bassett, 1979). These projects, several thousand in number, are part of a community open-space movement emerging as an alternative park system in cities such as Boston, New York, and San Francisco (Francis *et al.*, 1984). In contrast to public parks and playgrounds developed by park officials and professional designers, community open spaces are green areas designed, developed, and managed by local residents for the use and enjoyment of the community. In some cases, these parks and gardens are owned by their users as community land trusts. Community open spaces also include different elements than traditional parks, such as edible planting, elements designed and built by local teenagers or children, and storage space for tools used by nonpaid community maintenance people.

Research on community open spaces in New York City (Francis *et al.*, 1984), London (Hough, 1984; Stearn, 1981), and Sacramento (Francis, 1986b)

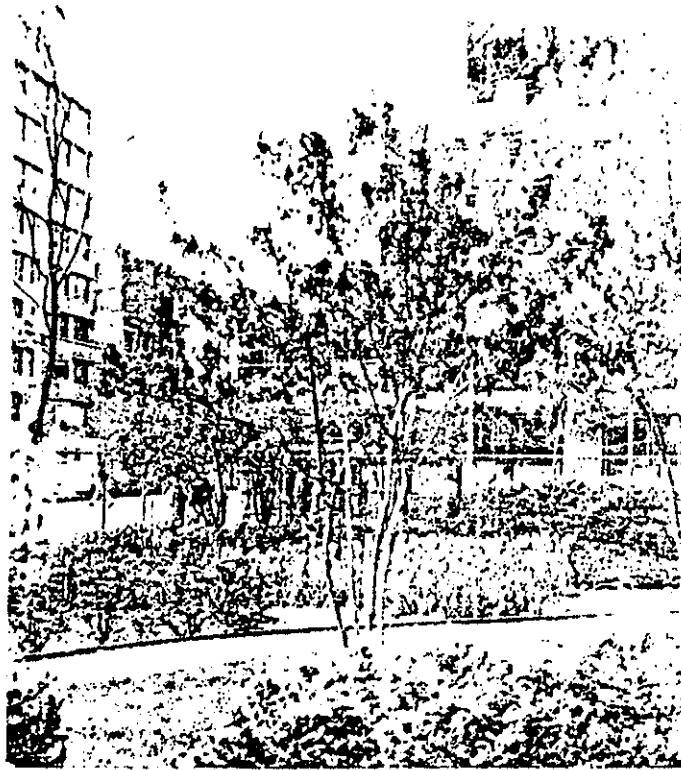


FIGURE 5. Jefferson Market Park, a community-designed, -developed, and -managed open space in New York City. From *Community Open Spaces* (p.) by M. Francis, L. Cashdan, and L. Paxson. Copyright 1984 by Island Press. Reprinted by permission.

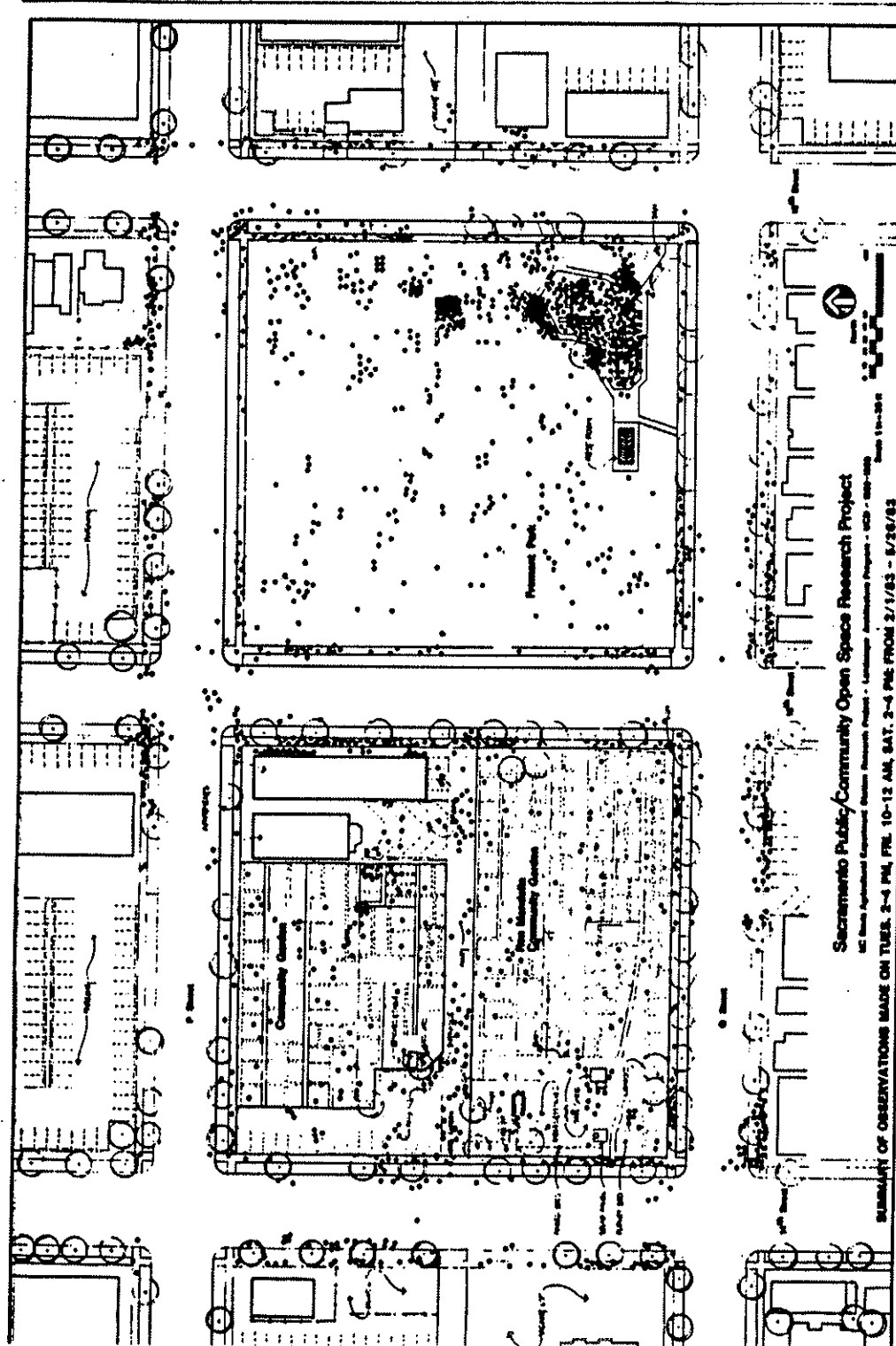
points to some of the unique social and economic benefits of community-built open spaces. Community open spaces are frequently used by people who do not make use of traditional open spaces. The spaces provide opportunities for neighborhood residents to develop and control part of their neighborhood, an advantage not afforded by traditional parks. In a comparative study of a public park and a community garden of similar size, adjacently located in downtown Sacramento, California (Francis, 1986b), the park was found to be 20 times more costly to develop and 27 times more costly to maintain than the garden, while receiving only 4 times as much use. In addition, the garden was rated higher by both users and nonusers on dimensions of visual quality, safety, and condition of facilities than the public park (see Figures 5 and 6).

Research on urban gardens and gardening has contributed concepts useful to open spaces in general. Kaplan (1973), in a benchmark study of gardening, found that vegetable raising produces important psychological benefits for gardeners. The meaning people attach to their own gardens may directly affect how they use and interpret urban open spaces. The relationship of the garden to the visual quality and attachment of residents to the neighborhood is another topic of research interest. For example, Brower *et al.* (1983) identified in a study of private gardens in Baltimore that features such as fences and plants contributed to feelings of safety in the neighborhood.

Researchers have identified the importance of neighborhood open spaces such as sidewalks, street corners, vacant lots, and alleys (Borchert, 1979; Hester, 1985). Research on neighborhood space has documented the network of spaces people use in a residential area including sidewalks and vacant lots (Francis, 1985; Moore & Young, 1978). Some researchers have suggested that children's access to nearby places such as stoops, front yards, and sidewalks is often more important for child development than use of neighborhood parks and playgrounds (Brower, 1977; Moore, 1985; Perez & Hart, 1980; see Figure 7).

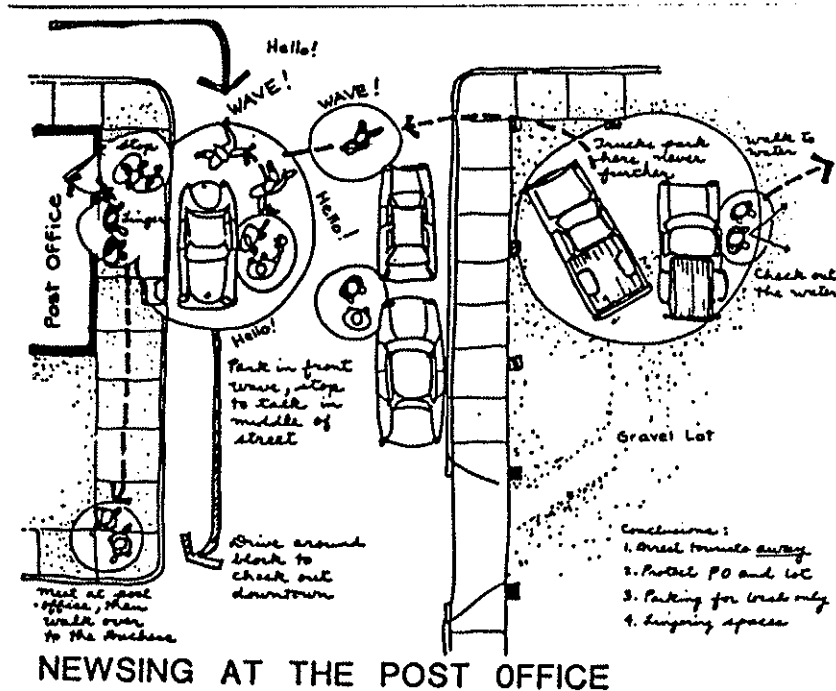
As an alternative to the familiar asphalt schoolyard, some teachers and parents have become interested in more creative and educational use of the outdoor environment around schools. A well-documented example is Washington Environmental Yard in Berkeley, California. Designed and constructed with active participation of children, parents, and teachers, the schoolyard contains natural areas for ecological study. In longitudinal observations of use both before and after changes were made on the schoolyard, Robin Moore found that group and individual activities increased along with the provision of and access to natural elements such as water and plants (Moore & Young, 1978). The yard is now managed by a community trust of parents, neighborhood residents, and teachers and is used as a center of school and community activity.

Streets make up much of the accessible open space of cities. In the 1970s, the notion of creating "livable" streets with reduced traffic gained in interest and application, particularly in Europe. Appleyard (1981) has reported on efforts to manage traffic and to improve attachment of people to urban and neighborhood streets. For example, the Dutch *woonerf* or play street has been developed to reduce traffic speeds and provide for activities such as ball playing, sitting, and communal use of neighborhood space. Over 800 *woonerf* areas or traffic-restricted areas have been developed in Dutch neighborhoods (Royal Dutch Touring Association, 1978). Other European countries including Denmark, Norway, and West Germany have adopted their own forms of traffic-restricted neighborhood streets (Muller, 1980). The social effects of street changes have been documented. Observational studies of Gågade pedestrian streets in Denmark by Jan Gehl (Berdichevsky, 1984; Gehl, forthcoming) found an 80% increase in pedestrian



Sacramento Public/Community Open Space Research Project
 UC Davis Agricultural Experiment Station Research Project - Landscape Architecture Program - GIS - 000-0000
 SUMMARY OF OBSERVATIONS MADE ON TUES. 2-4 PM, FRI. 10-12 AM, SAT. 2-4 PM FROM 2/1/83 - 5/26/83

FIGURE 6. Behavior map comparing use of public park and community garden in Sacramento, California. Although the park was observed to be used four times as much as the garden, it was twenty times more costly to develop and twenty-seven times more costly to maintain.



NEWSING AT THE POST OFFICE

FIGURE 7. Community activity mapping used in participatory studies of Manteo, North Carolina town landscape by landscape architect Randy Hester (drawing by Randy Hester). From *Places* (p.) by MIT Press. Copyright 1985 by MIT Press. Reprinted by permission.

activity after car access was restricted to the main street in Helsingør. Use of the street by the elderly was also found to increase, and the majority of user spent twice as much time on the street than before pedestrianization. Separate empirical studies of new woonerf neighborhood streets in Germany and Holland using comparable methods (Eubank-Ahrens, 1985; van Andel, 1985) have been completed. Both studies found increased children's use and greater socializing activities taking place after streets were designed to reduce traffic (see Figures 8 and 9).

Some research has shown that many pedestrian malls in the United States have largely failed to attract suburban shoppers downtown (Knack, 1982). An alternative successfully developed by some cities, including Portland, Oregon

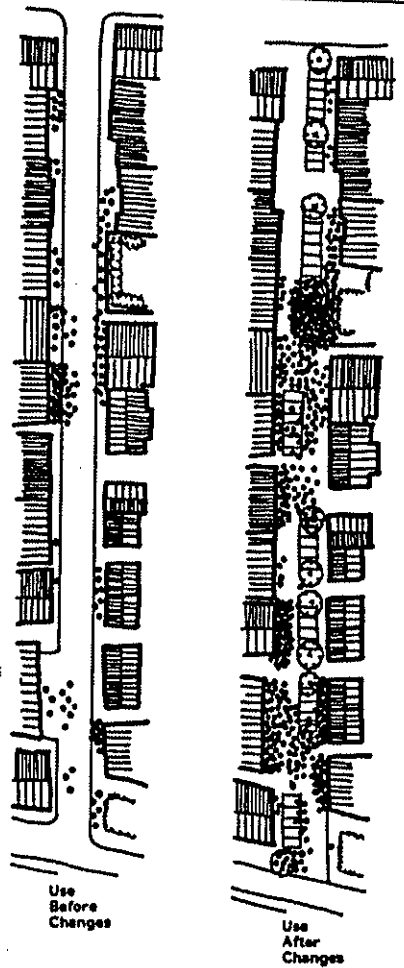


FIGURE 8. Behavior maps showing increased use of street after construction of *woonerf* in Hanover, West Germany. From "The Impact of *Woonerven* on Children's Behavior" by B. Eubank-Ahrens, 1985, *Children's Environments Quarterly*, 1, . Copyright 1985 by *Children's Environments Quarterly*. Reprinted by permission.

and San Jose, California, is offered by transit malls, which utilize buses rather than pedestrians as the focus of downtown street improvements. Buses and streetcars are given priority over autos to improve public access to the downtown.

Another type of innovative open space is the farmers' market or fleamarket. In a survey of farmers' markets in the United States, Sommer (1981) found markets in a variety of settings including downtown parks, parking lots, and under freeways. One reason Sommer found for the popularity of these markets was that consumers rated quality and taste of vegetables bought there much more highly than those purchased in supermarkets (Sommer, Herick, & Sommer, 1981). Seamon and Nordin, (1980) in a study of an outdoor market in Varberg,



FIGURE 9. Gågate pedestrian shopping street with movable play equipment in Rørrø, Norway.

Sweden, attributed the success of the space to the changing activity, or what they termed "place ballet," that occurred over time. Farmers' markets provide inexpensive ways to attract life and activity to underutilized areas of cities. They also can become town centers where people gather to buy fresh produce, meet friends, and exchange information. In a study of three farmers' markets in California towns, Tyburczy (1982) found that markets contribute to the economic vitality of downtown areas because trips to a farmers' market are frequently tied to trips to nearby businesses.

A creative use of existing street space developed in Great Britain is the urban or town trail (Goodey, 1979). A series of paths are marked through a

town or city for residents and school children to interpret local history. This innovative use of existing open spaces recognizes the potential for urban space as a focus of environmental learning.

Much open land in many cities is still vacant or undeveloped, derelict, and poorly managed. Only recently have cities begun to inventory vacant land and recognize the recreational and ecological potential of undeveloped areas (Stearn, 1981). For example, vacant land provides the opportunity to reintroduce large-scale natural systems into cities such as urban forests (Spirm, 1984) as well as to make additional space available for gardening.

One rediscovered type of open space is the urban waterfront (Heritage Conservation & Recreation Service, 1979). Neglected and ignored in the past, these areas, many publicly owned, provide opportunities for creating new open spaces as well as increasing public access to rivers, lakes, bays, and ocean fronts. San Francisco, Boston, Milwaukee, and Memphis all have recognized this potential and are currently implementing long-range plans to develop the urban waterfront areas of their cities.

Found or informal places where people naturally gather or meet comprise a long-ignored part of the public landscape. Examples of these spaces include downtown street corners, bus stops, steps to public buildings, and paths between buildings. Recognition of the importance of found spaces to the social life and culture of towns has increased (Carr *et al.*, in preparation). For example, San Francisco's downtown plan (1985) developed specific guidelines for the placement of street furniture, including newsstands and trash containers, in order to increase opportunities for meeting and socializing at informal downtown open spaces.

ISSUE- AND CONCEPT-ORIENTED RESEARCH

Research has contributed to an awareness of a number of issues common to urban open spaces. These are dimensions of open space quality that cut across a variety of settings. They also provide the components of a normative theory of urban open space.

USE/NONUSE/MISUSE OF OPEN SPACES

Who uses urban open spaces and why is a topic that has received some attention. In addition, the reasons why certain spaces are not used, or are used in a different way from what designers or managers intended, have been well documented (Gold, 1972; Rutledge, 1986). Use, or "livability" (Appleyard, 1981), is a dimension often employed to measure the success of open space.

Whyte (1980) argues that use of an open space is a critical ingredient of success. When empty or vandalized, a space simply does not work.

The nonuse and misuse of neighborhood parks have also contributed to the redesign of a number of neighborhood parks and the argument for expansion of user involvement in redesign and management (Brower, 1977). Awareness of the importance of home-based recreation and lack of children's access to many neighborhood parks, has forced some cities like Baltimore and Boston to provide smaller parks closer to people's homes.

DEVELOPMENTAL ISSUES

The needs of people at different stages of life are a major theme in urban open-space studies. Childrens' use of the public environment has been the focus of considerable research (Marcus & Moore, 1975; Moore, 1985; Moore & Young, 1978; Ward, 1978). For example, access to open space was found by Hart (1978) to be an important factor in children's understanding of the environment. A large body of research, reported in *Children's Environments Quarterly* in the United States and *Bulletin of Environmental Education* in Great Britain, has focused on the needs of children in playgrounds, streets, and neighborhoods.

Teenagers and the elderly are often major users of open space, yet their developmental needs are often ignored in open-space planning. Some research advances toward understanding the needs of teens and the elderly as open space users have been made, however. Home range was found to be smaller (van Vliet, 1983), and need for adventure greater (Ladd, 1975), for urban than for suburban teenagers. Godbey and Blazey (1983) interviewed elderly users of parks in five cities and found park visitation to contribute to a positive state of mind for the elderly. They further point out that the parks were designed primarily for children and young adults and offered few amenities for elderly users.

SAFETY AND SECURITY

Feeling secure or safe in an open space has been identified in several studies as an important prerequisite for people's use of a place (Schroeder & Anderson, 1983; Stewart & McKenzie, 1978). In the Bryant Park study (Nager *et al.*, 1976), safety was the most frequently reported barrier to people's use of the park. Efforts to redesign plazas and parks to discourage undesirables and drug dealers is an example of efforts to improve the sense of security in a space. Yet such efforts may in fact reduce social diversity in a space and discourage use. Attempts to remove some user groups from a space often only shift the users and the problem to another open space.

Safety is an important component of open-space satisfaction for women, children, and the elderly. Studies have found women to be fearful of using parks

(Stoks, 1983). A study of women's attitudes toward West Berlin's Jungfernhede Park (Wiedermann, 1985) found that only 10% of the 160 women interviewed would enter the park unescorted, while 70% of women using the park reported feeling insecure.

For children, traffic speed has been found to be a major factor in parents' restriction of children's access to open space (Perez & Hart, 1980). Appleyard (1981) has proposed 20 miles per hour as a maximum speed on residential streets. Playground safety is also a concern, especially for park officials faced with growing numbers of liability suits. One study reported that 118,000 people received hospital emergency room treatment in 1974 for injuries related to playground equipment (Wuellner, 1979). Current issues influencing lack of playground use include parent fear of toxic materials on play equipment and child kidnapping.

COMFORT

Another theme in urban open-space research is comfort. Adequate and comfortable seating, solar access, and protection from wind, rain, and other climatic elements have been found to be important reasons for open-space use and satisfaction. In a study of activity in a playground in San Francisco's Chinatown, Bosselmann (1983a) observed that use directly corresponded to times of greatest sunshine. The study resulted in evidence that convinced the City Planning Commission to deny approval of a new high-rise building that would shade the playground.

STRESS

The relationship of open space to stress has been studied. Ulrich and Simons (1986) used videotape simulation to test reaction to images ranging from natural to built environments. They found that subjects recovered significantly faster and more completely from stress when exposed to natural than to urban environments. In a related study, Ulrich (1984) compared hospital recovery rates for patients with and without views of trees from their hospital rooms. He found that surgical patients in the suburban Pennsylvania hospital with windows looking out on a natural scene had shorter postoperative stays, received fewer negative evaluative comments from nurses, and took fewer drugs than matched patients in similar rooms facing a brick building wall.

AESTHETICS AND PERCEPTION

Perception and aesthetics are important but poorly understood aspects of landscape quality (Appleton, 1975). How people perceive a space may contribute

to their use or lack of use of the place. Some empirical work has documented the elements that make up the perception of urban open space. Examples include the work of Im (1984) who found factors such as ground slope and vegetative cover to be predictors of open space visual quality, and studies by Ulrich (1979) and Aoki, Yasuoka and Naito (1985) on the importance of small scale vegetation in landscape satisfaction. Anderson, Mulligan, Goodman, and Regen (1983) found that sounds influence user perceptions of outdoor environments. In a study of attitudes toward the physical environment of federal post offices, Jay Farbstein found vegetation to be one of the items most highly rated by users.

User groups may perceive open space in different ways (Kaplan, 1985). Open space preferences have been found to vary between socioeconomic groups (Foresta, 1980), children and parents (Francis, 1983b; Hart, 1978), and park users and decision makers (Francis, 1986b). For example, visual quality is often one of the highest priorities for designers and officials in creating an open space, although visual quality is frequently given lower rating by users.

MEANING

There is growing awareness that use of an open space may not in itself be enough to make a space successful. The larger meaning of an environment for people is an important dimension of urban quality. Appleyard (1979) has argued that the environment serves as a social and political symbol loaded with meaning. Open spaces can have a larger "connectedness" for people, as seen for example in the national attachment to Times Square in New York City or local attachment to a central park in a small town. Some researchers have begun to establish that people do not have to use the space for it to have meaning or value to them (Carr *et al.*, in preparation). The fact that a space exists as an important symbol or reference may be enough for people to attach meaning to the open space even though they are not users.

CONTROL AND PARTICIPATION

An issue of growing research interest is the relationship of user control and participation to open-space quality. For example, both real and symbolic ownership has been determined to be an ingredient of people's satisfaction with community gardens and parks (Fox, Koeppel, & Kellam; Hester, 1984). The amount of freedom and control a space offers has been suggested as a basis for people's use and enjoyment of an open space (Carr & Lynch, 1981).

User participation in the design and management process can directly contribute to the later satisfaction of nonparticipating users (Kaplan, 1980). For example, the participation and control process was found to be one of the reasons small urban gardens are well cared for (Francis *et al.*, 1984; Nohl, 1984) and

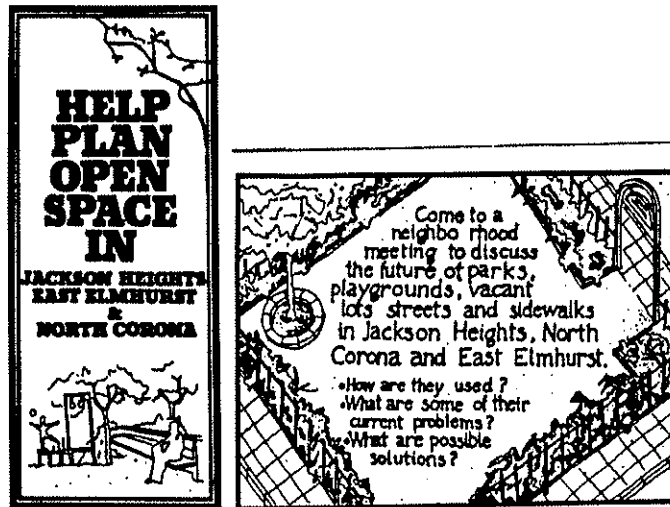


FIGURE 10. The public is becoming more involved in open space research and design. An example of a participatory open space planning process developed for New York City Community Planning Boards (drawing by Selim Iltus). From *Community Open Spaces* (p.) by M. Francis, L. Cashdan, and L. Paxson. Copyright 1984 by Island Press. Reprinted by permission.

may explain why nonusers may place a higher value on user-built than publicly provided parks (see Figure 10).

PRIVATIZATION AND PUBLICNESS

With some open spaces being moved indoors, privatization is emerging as an issue. For example, atrium spaces are locked, enclosed, and restricted spaces controlled by private interests with official approval. Concerns over privatization have also arisen in Europe, a source of many prototypes for pedestrian streets and plazas in the United States. For example, Korosec-Serfaty (1982) has documented with behavior mapping and historical analysis the "museumization" of neighborhood plazas in France. Many of these plazas, she argues, may have been preserved at the expense of changing the social and economic character around them.

Public access is a factor critical to open space quality. Lynch (1981) defines accessibility in terms of open-space rights, including the right of presence, use and action, appropriation, modification, and disposition. These rights, simply stated, are that people should have access to an open space, freedom to use the space, to claim and change the space through their use, as well as to transfer



FIGURE 11. Lockable Redwood Park in downtown San Francisco which is closed on weekends and evenings by private owners.

their right of use and modification to other individuals. Lynch's concept of spatial rights provides a useful measure of the effective "publicness" of an open space (see Figure 11).³

NATURAL SYSTEMS AND ENVIRONMENTAL QUALITY

Another emerging theoretical theme is that open spaces are part of a larger natural system critical to healthy city life. This view, advanced by landscape architects Hough (1984) and Spirn (1984), suggests that the city should be a natural system which maximizes clean air, water quality, and environmental health. They argue that open-space systems are where ecological processes can be incorporated through sensitive landscape design and management. For example, Spirn (1984) points to work in Stuttgart, West Germany where urban forests have been planned to provide clean air and timber for energy production. Hough (1984) has documented the important ecological diversity that exists in derelict or wastelands and suggests restraint in developing or overdesigning open spaces.

A growing body of research is focused on the relationship of people with the natural environment (Kaplan, 1983). For example, Lewis (1979) has outlined

³The concept of "publicness" was first developed by Lynn Paxson and Alan Forrest in a study of the waiting room of Grand Central Station as part of a doctoral seminar in environmental psychology taught by Leanne Rivlin and the author in 1979 at the City University of New York (Rivlin & Francis, 1979).

some of the psychological benefits people derive from interacting with plants and trees. He has hypothesized that interaction with plants contribute to increased self-esteem and greater satisfaction with other parts of one's life. In a study of favorite childhood environments of landscape architecture students, Cooper-Marcus (1978) found students' environmental autobiographies to include natural elements 86% of the time. Although this study helps to explain why students chose landscape architecture as a profession, similar findings have resulted from studies of nondesigners. Ulrich (1979) found that photographs containing natural elements result in increased positive feelings of "affection, friendliness, playfulness and elation" for a sample of college students. Yet much of the work on attitudes toward natural elements remains anecdotal.

ECONOMIC BENEFITS AND IMPACTS

Some research has centered on the economic impacts and benefits of urban open space (Schroeder, 1982). Empirical work by Correll, Lillydahl, and Singell (1978) found that proximity to greenbelts in Boulder, Colorado directly increases property values. In a study of urban parks, Hammer, Coughlin, and Horn (1974) determined that homes closer to a city park sold for higher prices than similar ones located further from the park.

PUBLIC ART

Public art has increased as a part of urban open space expenditures over the past decade (Beardsley, 1981; Leveque, 1985). Art is included in many open space projects due to programs that require 1% of construction budgets for public art. With the great rush to provide art in open spaces, surprisingly little empirical work has documented how public art is perceived and valued by the public. Art can be loaded with social meaning, as witnessed in the national debate surrounding the Vietnam Veteran's Memorial in Washington, D.C. (Howett, 1985). The controversy in New York City over Richard Serra's sculpture blocking the entrance to a federal office building is evidence of the growing public debate on the quality and content of art in urban open spaces (Storr, 1985).

METHODOLOGICAL ADVANCES

Qualitative and quantitative methodological advances (reviewed in Chapters 10 and 11 of this volume), have provided new and improved methods for open-space research. Some of the more important advances resulting from open-space studies warrant brief attention here. Many of the findings reported in this review are the result of studies utilizing observational methods. One

significant area of advancement has been in the collection and spatial display of behavioral data which can be directly utilized by planners (Hill, 1984). The work of Robin Moore on schoolyards (Moore & Young, 1978) and Eubank-Ahrens (1985) and van Andel (1985) on reconstructed neighborhood streets have produced documentation of behavior both before and after physical changes. Other mapping methods, such as using pin bar overlay drafting systems, that allow for spatial comparison of different data over a network of downtown open spaces have been developed (Francis, 1984).

Kenneth Helphand, Randy Hester, Florence Ladd, and Clare Cooper-Marcus have developed innovative techniques for examining open-space meaning by recalling previous landscape use with a technique called "environmental autobiography" (Cooper-Marcus, 1978). Participatory methods have become more advanced and more effectively applied to research, design, and management of open spaces (Kaplan, 1980; Moore, 1980). Tours of favorite open spaces, mapping of childhood spaces, and group decision-making techniques have become more refined and have influenced more settings (Francis, 1983a).

Considerable advances have been made using media for open-space evaluation (Appleyard, 1977). For example, time-lapse photography and inexpensive Super 8mm film have provided the data from which much of Whyte's research findings have been drawn (Whyte, 1980). Photography has become a popular and widely used technique in open-space research. Photographs of different open spaces have been used to assess open-space preference (Aoki *et al.*, 1985; Kaplan, 1985; Ulrich, 1979; Ulrich *et al.*, 1981) although this technique has also been criticized as being a misleading representation of real environments (Carlson, 1977). Simulation techniques have advanced with film and video simulation now used almost routinely at Berkeley's Environmental Simulation Lab to test the visual impact on downtown San Francisco of open-space proposals (Bosselmann, 1983b). Other simulation labs are operating in countries such as Holland and New Zealand. The declining cost and improved quality of color video systems is making it possible for researchers and design offices to record site use, conduct traditional site analysis, and present findings to clients. Computer graphics, although not frequently applied to open spaces, promises to be a useful technique for simulation and evaluation in future research (see Figure 12).

ADVANCES IN DESIGN AND MANAGEMENT APPLICATIONS

Research findings have been applied to existing and new open spaces in several important and innovative ways. These advances—in design guidelines, public policy, and development prototypes—illustrate how research knowledge has been directly applied to improving the public landscape of cities.

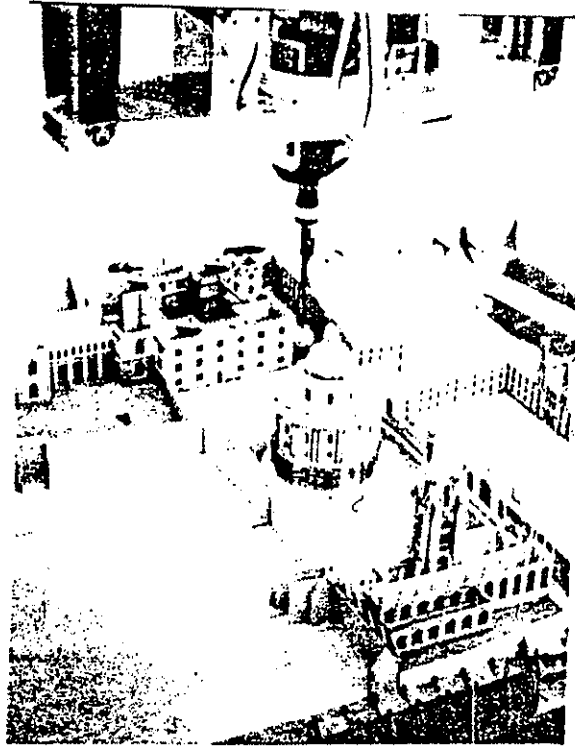


FIGURE 12. An innovative method used to evaluate open space and urban design proposals is the environmental simulation laboratory with models and video camera such as this one in Wellington, New Zealand.

DESIGN GUIDELINES

One area of research application is design guidelines which specify how spaces can be designed or improved based on past research. The work by Cooper-Marcus and Sarkissian (1986) on residential open-space guidelines, Whyte (1980) on plazas, and the open-space related patterns developed by Alexander, Ishikawa, and Silverstein (1977) are some of the most notable and pioneering examples of design guidelines. Other useful guidelines exist for play areas and playgrounds (Cohen *et al.*, 1979; Hill, 1978; Wuellner, 1979). Design guides as well as performance criteria (Lynch & Hack, 1984) are being used in open-space design and programming, as can be seen in programs for open-space design competitions incorporating guidelines from past research. One example is Palo Alto, California, where the City Council used William Whyte's film and book to develop

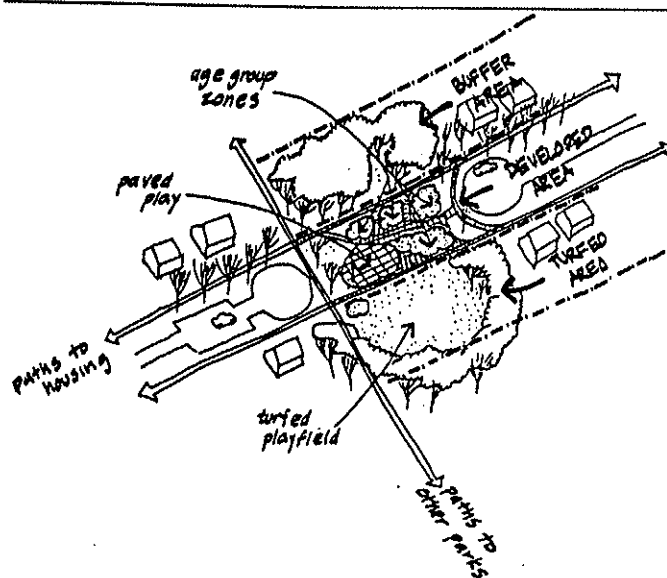


FIGURE 13. Planning guidelines for designing neighborhoods for children's play developed by Gary Moore (drawing by Tim McGinty). From "State of the Art in Play Environment Research and Applications" by G. Moore in *When Children Play* (p.) edited by J. Frost. Copyright 1985 by Association for Childhood Education International. Reprinted by permission.

a Request for Proposals to hire a landscape architect to redesign their central town square (see Figure 13).

POLICY AND DEVELOPMENT GUIDELINES

Another advancing area of research application is open-space requirements for new downtown development. With considerable new private development taking place in cities, local governments have found it necessary to provide clear guidelines and zoning incentives to ensure that successful open spaces are provided. Although an alarming number of new spaces are becoming privatized, new guidelines reflect the recognition and support in local government for socially successful open spaces.

Some of the most innovative open space guidelines have been developed in New York City for new buildings in midtown Manhattan (New York City Department of City Planning, 1981) and in downtown San Francisco (San Francisco Department of City Planning, 1985), both developed with Whyte as an

environmental social science consultant. The New York City guidelines have translated Whyte's research findings into public policy requiring new open spaces to provide amenities such as adequate seating space and food vendors. In San Francisco, the new zoning policy takes into account the impact new high-rise office buildings have on comfort in urban open spaces, and restricts new buildings that would block off sunlight from existing open spaces.

DESIGN AND DEVELOPMENT PROTOTYPES

Research advances in open space have influenced the development of a number of types of open space. For example, playground designers are beginning to provide more opportunities for child participation and modification. Neighborhood control and participation are leading to neighborhood parks containing user-built elements such as sitting areas and vegetable plots. Downtown streets and plazas now include more sittable space with special events programmed to attract a wider range of users (Project for Public Spaces Inc., 1984).

Past advances in open space theory and application have also been used to develop bold new proposals for city form and design. For example, Corbett (1981), Hayden (1984), Lynch (1981), and Sporn (1984) have advanced recommendations for restructuring city form based on concepts of changing family life-styles (see also Chapter 8), accessible open space, and the reintroduction of natural systems.

Ecological design is one innovative approach to open space design. Popular with some landscape architects in West Germany and Holland, this approach applies environmental planning principles to site design by introducing native vegetation and wildlife into existing open spaces (Spitzer, 1980). Corbett (1981) has successfully applied concepts such as natural drainage, energy-conserving site design, and native vegetation to the development of the Village Homes community in Davis, California.

TOWARD SOCIALLY SUCCESSFUL URBAN OPEN SPACES: THE ROLE OF RESEARCH IN DESIGN AND MANAGEMENT

Past research and application of research findings have contributed new perspectives and empirical evidence of the value of open space to urban life. The definition of urban open space has expanded, opening up new territory for research and theory development.

Dimensions of urban open-space quality can be gleaned from past advances in research and application. These dimensions, summarized briefly in Table 2, below, provide questions for future research, both theoretical and applied (Francis, 1986a, in press). One measurement of the success of an open space is

TABLE 2. Some Dimensions of Successful Urban Open Spaces Based on Recent Advances in Research and Practice^a

-
- Should be used by a variety of users including children, teens, and the elderly
 - Should allow for a variety of activities
 - People should feel safe and secure when using space
 - Space should be comfortable
 - Should afford opportunities for user involvement, control, and manipulation
 - Space should be publicly accessible
 - Provides opportunities for environmental learning
 - Includes opportunities for discovery, delight, and challenge
 - Should be ecologically healthy
 - Should contribute economic benefits to surrounding community
 - Is evaluated, redesigned, and improved over time
 - Is democratic
 - Is loved by those who use it and live or work nearby
-

^aAdapted from Francis (1986a; in press).

whether people are comfortable and feel safe in it. If so, it may be considered well used. Yet use, comfort, and safety may not be sufficient criteria alone to make a space successful. Public space rights including public access and opportunities for change and appropriation need to be respected. Users need to feel a sense of control and ownership over a space. The space also needs to provide opportunities for environmental learning and offer users a sense of discovery, delight, and challenge. Ecological and economic factors also need to be integrated into the planning and management of the space. The broader meaning or connectedness of people to the open space is also an important dimension of quality.

In part, the absence of many of these qualities in open spaces may be due to the design and development model commonly employed. Currently, most open spaces such as park and playgrounds are designed and constructed to last indefinitely, yet a designer's contractual role and responsibility ends with final construction. Little evaluation and redesign of urban open spaces occurs over time (Rendel, 1983).

The need for an ongoing process for urban open-space development is exemplified by efforts under way in many cities to redesign older, unsuccessful plazas, parks, and playgrounds. One of the most publicized examples is Copley Square Plaza in Boston (Chabier, 1985) originally designed in 1966. Increased social problems in the plaza prompted the City of Boston to mount a national design competition in 1984 to redesign it. The competition utilized a design program developed by consultant and jury member William Whyte which included requirements to provide seating for 1000 people, food service, and a farmers' market. The winning entry is currently in the final design stage, with a construction budget estimated at \$4.5–5 million.

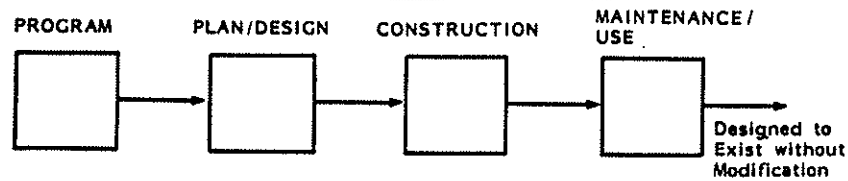


FIGURE 14. Traditional model of urban open space design and development.

An alternative approach to the original design model for Boston's Copley Plaza would be to treat urban open-space design as an evolutionary process where spaces are continually evaluated, redesigned, and repaired. Figure 14 shows the traditional linear approach to urban open-space design and development. Figure 15 shows an evolutionary approach where spaces are evaluated and redesigned after construction and use. The knowledge developed in the evaluation and redesign process is used to improve the existing space as well as to inform the design of new open spaces.

The application of an evolutionary approach to urban open-space development requires several steps. Clients and managers of open-space projects need to support, both in spirit and financially, ongoing evaluation and redesign. Due to the changing needs and populations using open space, a number of parks departments now utilize some type of evaluation and upgrading process of their facilities. Clients of open-space designers could routinely hold back 5 to 20%

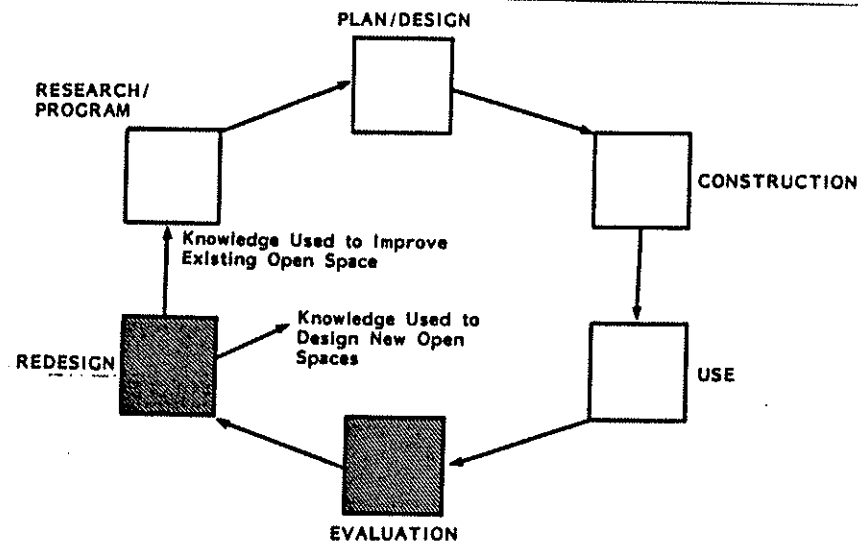


FIGURE 15. Evaluation/Redesign model of urban open space design and development.

of open-space budgets as a contingency fund for postoccupancy evaluation (POE), redesign, and reconstruction. This approach recognizes that mistakes will be made and assumptions in use or activity are not always correct in a design process, even ones guided by advances in research reviewed in this chapter.

Contingency funds could then be used to support postoccupancy evaluation and user participation to determine how well the open space is working. Physical layout can be adjusted and the fit between activity and environment improved. The open space can be reprogrammed and repaired according to the insights gained in this evaluation process. For heavily used or large scale open spaces, this cycle may need to be repeated on an annual or semiannual basis. The cost of this process could be offset by a decrease in the maintenance and vandalism costs that are experienced with traditionally designed and managed open spaces.

Successful open spaces often change in character and use over time. In contrast, designers frequently overdesign spaces due to an ambivalence or lack of understanding about the true purpose or use of the space. Overdesign, as Laurie (1978) has pointed out, can destroy a place, making it unsuited for the changing needs of open-space users. To create successful places, designers need to show more restraint in design and a willingness to come back and adjust the space based on user evaluation and local participation.

IMPLICATIONS FOR FUTURE RESEARCH AND ITS APPLICATIONS

There are several important frontiers facing future open-space research and practice. Parks and playgrounds will continue to be a theme in environmental design research. Future work could focus on child-designed and built playgrounds, playground safety, and the effect of toxic materials in some playground equipment on public health.

Additional research is needed on the economics of open space, including comparisons of different maintenance and development approaches. With some existing open spaces vulnerable to displacement by new development, the economic value of open spaces as compared to other land uses will need to be more clearly documented. There has been little research to explore the effect of larger social and political movements on the form and character of urban open spaces. Further work on the historical and political evolution of open space, such as done in the United States (Cranz, 1981) and in Great Britain (Walker & Duffield, 1983), is required to better understand how open spaces come to be valued by society. Additional work is needed to confirm initial findings regarding the social and psychological importance of natural elements (Altman & Wohlwill, 1983). More empirical work on open-space aesthetics and perception like that conducted on rural landscape perception under the broad title of visual resource management is needed (Zube, Sell, & Taylor, 1982).

Future research is also needed to develop new theory on the role open space plays in urban life. Like many areas of environment-behavior studies, open-space research still lacks normative theory to explain the full meaning of open space in everyday life. Theory building is one of the most interesting and challenging frontiers for future work.

The broadening interest in the quality of the public environment of cities provides clear opportunities for future work. Past advances also raise important questions to be faced by future open-space researchers, designers, and managers. For example, who should open space be designed for? Should spaces be purposely planned to restrict access for some groups? Or should open spaces be designed as diverse, democratic spaces? Are current open-space standards used by cities still accurate and useful, on the basis of recent advances in research? What role should different publics—users, nonusers, managers, and others—play in the open space decision-making process? What broader connections do people have with open spaces? How do these meanings affect public attitudes toward other built environments?

Questions such as these provide considerable opportunities for future work. Advances in research and application make it possible to more fully explore the role of open space in urban life. Landscape architects, architects, and urban designers can more than ever before benefit from this new knowledge. With interest in the public landscape of cities on the part of designers, city officials, and researchers still strong, urban open space can be expected to continue as a vigorous area of environmental design research.

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